

Applicant: Ishiduka et al.
Amendment and Response of May 7, 2009
Response to Office Action of February 10, 2009
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Remarks/Arguments:

Claims 1-13 are currently pending in this application. Claim 1 has been amended. Claim 3 has been cancelled. Claims 14-24 have been added. Support for the amendments can be found in the specification as originally filed. Applicants respectfully request reconsideration of the application based on the following remarks.

Applicant's Response to 35 U.S.C. §103 (a) Rejection over Kanna

Claims 1-11 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over U.S. Patent Publication No. 2004/0009430 to Kanna et al. (hereinafter “Kanna”). Applicants respectfully traverse this rejection and request reconsideration on the basis that Kanna fails to render the claims obvious.

The Examiner acknowledges that Kanna does not teach the combination of recurring units (a1), (a2) and (a3), but alleges that:

...it would have been obvious to one of ordinary skill in the art to combine the recurring units because Kanna teaches recurring units combined in any combination as shown increases solubility of the resin in an alkali developer, has less line edge roughness and less development time.

(Office Action, at pages 3-4) (citations omitted).

Claim 1 has been amended. In particular a recitation was added to claim 1 where “in the resin component (A), the constitutional unit induced from methacrylic ester is 20 to 80 mol %, and the constitutional unit induced from acrylic ester is 20 to 80 mol % relative to the total amount of these constitutional units.” Nowhere in Kanna is such a positive-type resist composition for liquid immersion lithography disclosed or suggested.

Kanna discloses a resin comprising repeating units having the groups shown by general formula (Z), as a resin whose solubility with respect to an alkali developing solution increases

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as a result of decomposition by the action of an acid. (Kanna, paragraphs [0017] to [0025]). As examples of this resin, resins having the repeating units shown by general formulas (I), (II) and (VI) are disclosed, and it is further disclosed that the repeating units shown by general formulas (VII) to (XVII) may be included. (Kanna, paragraph [0031]). The structural units (a1) and (a2) of the present invention are included in the structural units shown by (VIA) and (XIII).

Kanna has the objective of providing a resist composition showing sufficient transmissibility when using a 157 nm light source, improved solubility with respect to an alkali developing solution, reduced line edge roughness, and a reduced developing time. However, Kanna does not disclose the use of a characteristic exposure method such as immersion lithography.

The combination of repeating units for constituting the resin disclosed in Kanna covers a very broad range. Contrary to the Examiner's allegation, it would not have been easy to select from among the broad range a combination of repeating units for constituting a resin suitable for a resist composition for immersion lithography having a high contact angle with respect to the immersion liquid, excellent in liquid immersion characteristics, and in particular, having a high barrier property with respect to water.

In the present invention, the constitutional units are introduced from both of methacrylic ester and acrylic ester are included so that the positive-type resist composition for liquid immersion lithography can be obtained, having decreased surface roughness and line edge roughness during etching, and having superior resolving ability and increased depth of focus.

Although Kanna discloses repeating units of methacrylic ester and acrylic ester, nothing is disclosed or implied regarding the use of both units in a specified ration or effects thereof.

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In view thereof, claims 1-11 are not obvious in view of the teachings of Kanna. Applicants respectfully request reconsideration of the Section 103 rejection based on this combination.

Applicant's Response to 35 U.S.C. §103 (a) Rejection over Kanna in view of Kawashima

Claims 1, 12 and 13 are rejected under 35 U.S.C. §103(a) as allegedly being unpatentable over Kanna in view of U.S. Patent Publication No. 2004/0119954 to Kawashima et al. (hereinafter "Kawashima"). Applicants respectfully traverse this rejection and request reconsideration on the basis that the combination of references fails to render the claims obvious.

The Examiner acknowledges that Kanna does not disclose a resist composition that may be formed by immersion exposure, but alleges that:

Kawashima teaches an immersion exposure method comprising water as the immersion liquid using an ArF laser. Kanna also teaches exposure of a resist composition with an ArF laser. It would have been obvious to one of ordinary skill in the art to use immersion exposure in the composition of Kanna because immersion exposure enhances performance in forming patterns and prevents deteriorating image performance.

(Office Action, at page 3) (citations omitted).

As described in detail above, claim 1 has been amended.

Kawashima discloses a technique for an immersion exposure method using an ArF laser as a light source and using water as the immersion liquid. However, Kawashima does not disclose or suggest a structure of a resin for use in a resist composition for achieving the objectives of the present invention.

The immersion exposure method is a technique which, instead of using a shorter light

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source wavelength in order to achieve a high resolution, uses a light source having the same wavelength as the exposure method of prior art to achieve a high resolution.

Both Kanna and Kawashima use an ArF laser as the light source. However, the Examiner's assertion that, because Kanna and Kawashima have the same light source, it would have been easy to use the composition of Kanna in the immersion exposure is erroneous. If one skilled in the art were to attempt to apply the resin disclosed in Kanna to the immersion exposure method, because a very broad range is disclosed, it would not be easy to combine the repeating units in order to achieve the objective of the present invention from among the repeating units for constituting the resin.

In view thereof, claims 1, 12 and 13 are not obvious in view of the teachings of Kanna, alone or in combination with Kawashima. Applicants respectfully request reconsideration of the Section 103 rejection based on this combination.

New claims 14-24 have been added. New claim 14 is an independent version of original claim 3, which has been cancelled. New claims 14-24 are fully supported by the specification, as originally filed, and do not contain new matter.

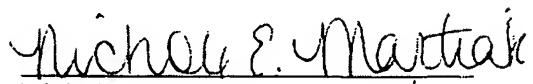
Should the Examiner have any questions or comments concerning the above, the Examiner is respectfully invited to contact the undersigned attorney at the telephone number given below.

The Commissioner is hereby authorized to charge payment of any additional fees associated with this communication, or credit any overpayment, to Deposit Account No. 08-2461. Such authorization includes authorization to charge fees for extensions of time,

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if any, under 37 C.F.R. § 1.17 and also should be treated as a constructive petition for an extension of time in this reply or any future reply pursuant to 37 C.F.R. § 1.136.

Respectfully submitted,



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